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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

YAMNITZKY, MARIE ROSE

ART UNIT	PAPER NUMBER
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1774

DATE MAILED: 10/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/995,608

Applicant(s)

TSUBOYAMA ET AL.

Examiner

Marie R. Yamnitzky

Art Unit

1774

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's amendment filed on July 06, 2004, which amends claims 1 and 10, has been entered.

Claims 1-10 are pending.

2. During a telephone conversation with applicant's representative, Jason Okun, on August 17, 2004, the examiner set forth an election of species requirement identifying the following seven patentably distinct species (the "conditions" are as set forth in present claim 1):

- compounds meeting one of conditions A, B, H or I
- compounds meeting condition C or D
- compounds meeting condition E
- compounds meeting condition F
- compounds meeting condition J
- compounds meeting condition K(i)
- compounds meeting condition G or K(ii).

On August 20, 2004, a provisional election was made to prosecute the species identified as compounds meeting condition J. The elected species was used as the starting point for search and examination purposes.

3. The examiner hereby withdraws the election of species requirement set forth on August 17, 2004 because all species within the scope of the present claims were ultimately searched. Because the election of species requirement is withdrawn, previously withdrawn claims 2-4, 11 and 12 are now entitled to consideration.

4. Claims 1-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase "the partial structure ML, L'n being represented by a formula (4), a formula (5) or a formula (6)" is recited in lines 8-9 of claim 1 and lines 12-13 of claim 10 (emphasis added). This phrase is confusing because, in view of the specification, none of formula (4), (5) or (6) represents a partial structure comprising L, and formula (6) does not represent a partial structure comprising M. Formula (4) and formula (5) represent a partial structure ML'n. Formula (6) represents L'.

Conditions B) and H) are confusing because the definitions of n and L' conflict. If n=0, no L' is present. (Since M=Ir and m=2 for conditions B and H, the examiner presumes that n should equal 1 rather than 0 for these two conditions.)

Condition D) is confusing because the definitions of CyC3 and CyN3 for ML'n are inconsistent with the definitions set forth earlier in the claim. "CyC3" and "CyN3" should be reversed for ML'n in condition D (i.e. "CyC3=Pr" should read --CyN3=Pr-- and

“CyN3=Tn1...or Ph” should read --CyC3=Tn1...or Ph--). In conjunction with changing “CyN3” to --CyC3--, “Pz2” should be changed to --Pz1-- in the fifth line of condition D.

The compounds defined by condition F) are not clear.

Condition F) recites “when CyN3=Py1 and R₁-R₄=H, CyC3=Cn1, Cn2 or Pz1”. It is not clear what CyC3 is when CyN3=Py1 and one or more of R₁-R₄ (one or more of R₁, R₂ and R₄) ≠ H. It is not clear if R₁-R₄ (R₁, R₂ and R₄ since there is no R₃ in Py1) must be H when CyN3=Py1.

Condition F) recites “when CyN3=Py2 and, then, in ML_m, R₁-R₄=H, CyC3=Q_x, Q_{z1}, or Q_{z2}”. In this recitation, “in ML_m, R₁-R₄=H” is unnecessary since this requirement is set forth in line 3 of condition F. There is no definition of R₁-R₄ in ML_n.

Condition F) recites “when CyC3=Ph or Tn3, in ML_n: R is CH₃ or H; R₂ and R₄ are, independently, H or CF₃; and R₃=H”. This third “when” clause of condition F does not explicitly define CyN3 in ML_n, but condition F initially limits CyN3 to Py1 or Py2. It is not clear how the third “when” clause correlates with the first and second “when” clauses of condition F, which limit CyC3 to possibilities other than Ph or Tn3 when CyN3 is Py1 or Py2.

Conditions G) and K)ii) set forth formulae (11), (12), (13) and (14) as representing L', but these formulae do not represent L' alone. Instead, these formulae represent ML_n.

Condition K)i) is confusing. Based on the definitions of CyN2, CyN3, CyC2, CyC3 and R₁-R₄ for condition Ki, condition Ki covers platinum compounds in which the two ligands are the same (when CyC2 and CyC3 are both Ph or both Tn1 and each R₁-R₄ is H). However,

condition Ki recites "m=1; and n=1" which, based on lines 4-5 of claim 1 and lines 8-9 of claim 10, implies that the two ligands must be different.

Claim 4 is confusing and does not properly further limit present claim 1. Formula (6) as set forth in claim 4 is different than formula (6) as set forth in claim 1. Claim 4 is also inconsistent with the conditions set forth in claim 1. Claim 4 depends from claim 2, which depends from claim 1. Claim 2 limits the compounds to compounds wherein the partial structure MLm is represented by formula (2). Accordingly, claim 2, with claims 3 and 4 dependent therefrom, is limited to compounds meeting one of conditions A, B, H or I. Of these four conditions, only conditions B and H allow for a partial structure within the scope of formula (6) as set forth in claim 4, and only allow for a partial structure of claim 4's formula (6) in which each of E and G denotes a methyl group. Further, conditions B and H only allow M to denote Ir.

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-5, 7 and 10-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Igarashi et al (US 2001/0019782 A1).

Igarashi et al. disclose iridium metal coordination compounds for use as light emitting compounds in organic electroluminescent devices.

The compound represented by formula (1-23) in Igarashi's published application is a compound represented by present formula (1) that meets condition A) as set forth in present claims 1 and 10. This compound further meets the limitations of present claims 2, 3, 5 and 7, and the limitations of the compound required for the device of claims 11 and 12.

The compound represented by formula (1-24) in Igarashi's published application is a compound represented by present formula (1) that meets condition B)i) as set forth in present claims 1 and 10. This compound further meets the limitations of present claims 2-5 and 7, and the limitations of the compound required for the device of claims 11 and 12.

The present application claims priority of three Japanese applications, one of which was filed prior to the U.S. filing date of Igarashi's application. Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

7. Claims 1, 5, 7, 10, 13 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Tsuboyama et al. (US 2002/0068190 A1).

The applied reference has a common inventor with the instant application, but a different inventive entity. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the

reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

This rejection is made subject to clarification of condition K)i). Tsuboyama's Ex. Comp. 128 is a compound of present formula (1) in which $M = Pt$, $CyN2 = CyN3 = Pr$, $CyC2 = CyC3 = Ph$ and each $R_1 - R_4$ is H. Tsuboyama's Ex. Comp. 130 is a compound of present formula (1) in which $M = Pt$, $CyN2 = CyN3 = Pr$, $CyC2 = CyC3 = Tn1$ and each $R_1 - R_4$ is H.

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1-5, 7, 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Igarashi et al. (US 2001/0019782 A1) as applied above, and for the further reasons set forth below.

Igarashi et al. disclose two specific compounds within the scope of present independent claims 1 and 10, and suggest various others.

Igarashi's compounds of formulae (1-23) and (1-24) are specific examples of a compound having a partial structure represented by formula (4) as taught, for example, in paragraphs [0023]-[0024] of the published application. Examples of, and preferences for, the variables for formula (4) are set forth in paragraphs [0055]-[0057] of the published application.

Igarashi's compound of formula (1-23) is a compound of present formula (1) wherein MLm is represented by formula (2), M is Ir, m=3, n=0, CyN1 is Pr, CyC1 is Ph, X is Cr2, and each of R₁-R₆ is H. Based on Igarashi's teachings in paragraphs [0056]-[0057], it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make compounds similar to the compound of formula (1-23) having a divalent group such as present O, S or NR instead of present Cr2 since each of these divalent groups is taught in paragraph [0056], and O and S are among the preferred divalent groups taught in paragraph [0057].

Other compounds meeting one of present conditions A), B)ii), H) or I) are suggested by Igarashi's teachings. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make compounds similar in structure to the specific compounds disclosed by Igarashi et al. with the expectation that compounds similar in structure would be suitable for Igarashi's purposes. For example, one of ordinary skill in the art would have reasonably expected that compounds similar to Igarashi's compounds of formulae (1-23) and (1-24) having a fluorine in place of each of the two hydrogens on the divalent linking group Ln¹ (as in present conditions H) or I)) would have similar properties and could be used for the same purpose based on Igarashi's disclosure in paragraph [0056] that Ln¹ may represent -C(R¹³¹)(R¹³²)- in which R¹³¹ and R¹³² may represent a hydrogen atom or a halogen atom. As

another example, based on Igarashi's disclosure in paragraph [0055], one of ordinary skill in the art would have reasonably expected that compounds having combinations of rings provided by Z^{11} and Z^{12} other than the combination of a benzene ring and a pyridine ring (such as the combination of a benzene ring and a pyrazole ring) would emit light and could be used in an organic electroluminescent device as taught by Igarashi et al.

10. Claims 1, 5, 7, 10, 13 and 14 are rejected under 35 U.S.C. 103(a) as being obvious over Tsuboyama et al. (US 2002/0068190 A1).

The applied reference has a common inventor with the instant application, but a different inventive entity. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was

made, owned by the same person or subject to an obligation of assignment to the same person.

See MPEP § 706.02(l)(1) and § 706.02(l)(2).

This rejection is made subject to clarification of condition K)i). Tsuboyama's Ex. Comp. 128 is a compound of present formula (1) in which $M=Pt$, $CyN2=CyN3=Pr$, $CyC2=CyC3=Ph$ and each R_1-R_4 is H. Tsuboyama's Ex. Comp. 130 is a compound of present formula (1) in which $M=Pt$, $CyN2=CyN3=Pr$, $CyC2=CyC3=Tn1$ and each R_1-R_4 is H.

While Tsuboyama's Ex. Comp. 128 and 130 meet the definitions of M, $CyN2$, $CyN3$, $CyC2$, $CyC3$ and R_1-R_4 as set forth in condition Ki, they are compounds in which two identical ligands are complexed with the platinum and therefore do not meet the requirement that L and L' denote different bidentate ligands. L and L' are both present when $m=1$ and $n=1$ as recited in condition Ki.

The generic formulae of Tsuboyama's disclosure encompass a variety of platinum compounds, including compounds having a partial structure of present formula (3) and a partial structure of present formula (4) in which the two ligands are not identical. As taught by Tsuboyama et al., $CyN1$ and $CyN2$ independently denote a cyclic group containing a nitrogen atom connected to Pt and capable of having a substituent, and $CyC1$ and $CyC2$ independently denote a cyclic group containing a carbon atom connected to Pt and capable of having a substituent. Each of the possibilities set forth for $CyN2$, $CyN3$, $CyC2$, $CyC3$ and R_1-R_4 in present condition Ki are disclosed by Tsuboyama et al. It would have been a *prima facie* obvious modification to one of ordinary skill in the art at the time of the invention to make compounds within Tsuboyama's generic disclosure utilizing different combinations of specific

ligands disclosed by Tsuboyama et al. in order to provide a variety of phosphorescent platinum compounds suitable for use as an emitting material in Tsuboyama's luminescence device. One of ordinary skill in the art at the time of the invention would have reasonably expected, for example, that a platinum compound having one of the Pr-Ph ligands of Tsuboyama's Ex. Comp. 128 and one of the Pr-Tn2 ligands of Tsuboyama's Ex. Comp. 130 would be phosphorescent and could be used in a luminescence device.

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

11. Claims 1, 5-10, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thompson et al. (US 2002/0034656 A1).

Present condition G) encompasses iridium compounds having two 8-hydroxyquinolate ligands (as in present formula (11)) and a bidentate ligand such as a phenylpyridine, benzothienylpyridine or thienylpyridine ligand.

The compound meeting present condition J) is an iridium compound having two benzothienylpyridine ligands and one phenylpyridine ligand.

Present condition K)ii) encompasses platinum compounds having one 8-hydroxyquinolate ligand (as in present formula (11)) and a bidentate ligand such as a phenylpyridine, benzothienylpyridine or thienylpyridine ligand.

Thompson et al. disclose phosphorescent iridium and platinum organometallic complexes for use as light emitting compounds in organic electroluminescent devices.

Thompson et al. teach that the complexes may be of the formula $LL'L''M$ wherein each of the L ligands is a bidentate, monoanionic ligand. The bidentate ligands may be the same or different. For example, see paragraph [0052], Fig. 50 and claims 84-88. Thompson et al. disclose benzothienylpyridine ligands and phenylpyridine ligands as useful bidentate, monoanionic ligands for iridium compounds of Thompson's invention. For example, see Fig. 31, Fig. 50, paragraph [0183] and claims 69-70. 8-hydroxyquinolate and thienylpyridine ligands are also disclosed as useful ligands for iridium compounds of Thompson's invention. For example, see claim 71.

Thompson et al. do not disclose a specific example of an iridium complex having two benzothienylpyridine ligands and one phenylpyridine ligand, but one of ordinary skill would have reasonably expected that an iridium compound comprising both of these ligands would be a phosphorescent compound suitable for use as a light emitting compound in an organic electroluminescent device based on Thompson's teachings. Thompson et al. do not disclose a specific example of an iridium complex having two 8-hydroxyquinolate ligands and a bidentate ligand such as a phenylpyridine, benzothienylpyridine or thienylpyridine ligand, or a platinum complex having one 8-hydroxyquinolate ligands and a bidentate ligand such as a phenylpyridine, benzothienylpyridine or thienylpyridine ligand, but one of ordinary skill would have reasonably expected that iridium and platinum complexes comprising these combinations of ligands would be phosphorescent and would be suitable for use as light emitting compounds in organic

electroluminescent devices based on Thompson's teachings. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make iridium and platinum complexes comprising combinations of ligands taught as useful by Thompson et al. in order to provide a variety of complexes suitable for use in Thompson's device.

Further with respect to the platinum complexes of present condition Kii, while Thompson et al. generally teach complexes having three bidentate ligands complexed to a transition metal, Thompson et al. also disclose platinum complexes having two bidentate, monoanionic ligands. It would have been *prima facie* obvious to one of ordinary skill in the art that only two bidentate, monoanionic ligands are needed when the metal is platinum (II). One of ordinary skill in the art at the time of the invention would have reasonably expected that platinum (II) complexes consisting of Pt(II) and two different L ligands, or consisting of Pt(II), an L ligand and an X ligand, would be phosphorescent and would be suitable for use as light emitting compounds in organic electroluminescent devices.

12. Miscellaneous:

The examiner suggests inserting --is-- after "CyN4" in the phrase "CyN4 a cyclic group" as recited in claims 1 and 10 (fourth line after formula (6)).

Claims 1 and 10: A definition of R₁-R₄ is set forth for MLm in conditions C), D), E) and F) where CyN₂=Py₁ and CyC₂=Ph. There is no R₄ in Py₁ or Ph. The examiner suggests changing "R₄" to --R₃-- in these instances.

Claims 1 and 10: Condition E) defines R_1 - R_4 "when $CyN3=Pa$, $CyC3=Qn1$ or $Qn2$ ".

There is no R_3 in Pa , $Qn1$ or $Qn2$. The examiner suggests changing " R_1 - R_4 " to $--R_1, R_2$ and R_4-- in these instances.

Each of claims 1 and 10 is lacking a period at the end of the claim.

13. Potentially patentable subject matter, subject to clarification of issues raised under 34 U.S.C. 112, second paragraph:

With respect to conditions A) and B) as set forth in present claims 1 and 10, the published application of Igarashi et al. (US 2001/0019782 A1) represents the closest prior art. Compounds meeting condition B)iii) and B)iv), and compounds meeting condition A) wherein X of formula (2) is CO, are patentable over Igarashi et al. without perfecting applicant's claim for foreign priority because Igarashi et al. does not teach CO as a linking group for Ln^I of Igarashi's formula (4).

With respect to conditions G) and K)ii), the published application of Thompson et al. (US 2002/0034656 A1) represents the closest prior art, but the ligands necessary to provide present formulae (12), (13) and (14) are not disclosed.

With respect to conditions C), D), E) and F), the prior art does not disclose or suggest an iridium complex having at least one $Py1$ -Ph ligand as required by these conditions.

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14. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

The current fax number for Art Unit 1774 is (703) 872-9306 for all official faxes.
(Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

MRY
October 16, 2004



**MARIE YAMNITZKY
PRIMARY EXAMINER**

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